

THE VERTICAL DISTRIBUTION OF MEIOBENTHOS IN COASTAL SEDIMENTS (BELGIUM)

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Thus far, it is known that grain size, oxygen and chemical substances, determined by redox reactions, pH, salinity, temperature and pollution, have a strong structuring impact on the meiofauna community. The abiotic environment is build up by the effect of interaction between these factors. The synergistic enhancing impact of some factors stresses the complex character of the system. The reaction of the meiofauna with each of the components of the abiotic environment is difficult to estimate and can only be tested by experiments. Nevertheless, as the meiofaunal assemblage lives in and is adapted to this abiotic environment, a detailed knowledge of the interaction of the meiofauna with its abiotic environment as a whole, is needed.

This study is part of the project 'Impulsprogramme SEA' (MS/02/080). Three stations along the Belgian coast are selected in order to test extreme habitat conditions (figure 1).

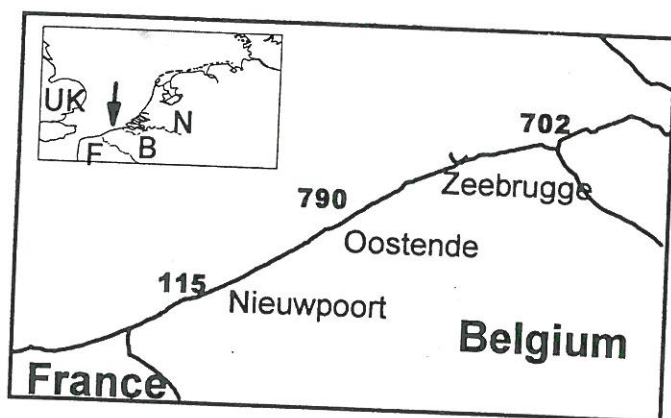


Figure 1

keywords: meiobenthos, nematodes, vertical distribution

Station 115 is located on the western part of the Belgian coast, near the French boarder. It consists of fine sandy sediment with an important mud fraction (average 67%). Station 702 is situated near the mouth of the Westerschelde. It is characterised by a fine sandy sediment with a somewhat lower mud fraction. This sediment is rather anaërobe, caused by the continuous output and subsequently sedimentation of pollutants from the Westerschelde water. Station 790 is situated in coarser sediments (without mud), central between the former stations.

Samples are taken by subsampling a box-corer on board of the R.V. Belgica. Subsequently, the cores were subdivided in one cm slices and used for the measurement of meiofauna density, bacterial density, sediment composition, redoxpotential, organic carbon, pigment and nutrient concentrations.

The oxygen supply to the sediment, which is undoubtedly related to the granulometry, is known as one of the most important structuring parameters, as most meiobenthic animals have very high oxygen demands. As a consequence the largest part of the meiobenthos is restricted to the uppermost oxic layers of the sediment where free oxygen is available. Apart from these oxygen reducers, there exist organisms which can generate energy from the reduction of other chemical bounds. This will result in a typical species assemblage around the oxic, the oxidized and the reduced layer and the RDP transition zone. The overall reducing and oxidizing capacity of the sediment is given by the redoxpotential. A direct indication of the performance of these layers is given by the redoxpotential. By this, all electron transport systems and redoxcouples in addition to oxygen are considered (Giere, 1993).

In the coarse sand of station 790 a large oxidized band -more than 10 cm- is observed vs. an almost completely reduced situation in the fine sands with high mud concentrations (station 115 and 702). Nematode diversity is highest in the well oxygenized situations. Statistical analysis (TWINSPAN, Ordination) reveals that the biotic community can be divided into three distinct layers according to the abiotic environment. The thickness of the bands varies with the sediment conditions. Each station shows a very high variability seasonally as well: the oxygen stress in the subtidal zone of the North Sea is not at all constant throughout the year. The high mobility of the fluid mud creates so far unpredictable eutrophication stress in the nematode species assemblages. Nevertheless, the upper well oxygenized layers are characterised by a high diversity of species of the following genera: *Daptonema*, *Richtersia*, *Ixonema*, *Rhynchonema*, *Sigmophoronema*. The

second layer has a lower redox potential, the typical species here are *Sabatieria* spec.. The third layer comprises the deepest parts of the sediment with low species diversity and abundance.

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